REMARKS

This application has been carefully reviewed in light of the Office Action dated August 25, 2003. Claims 1, 6, 18, 25, 56, 61 and 66 have been amended. Claims 15, 16, 36, and 60 have been canceled. Claims 1-4, 6-10, 12-14, 17-35, 46-59, and 61-68 are now pending. Reconsideration of the above-referenced application in light of the amendments and following remarks is requested.

Claims 56-68 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Baum. The rejection is respectfully traversed and reconsideration is respectfully requested in light of the current Amendment.

Baum does not teach or suggest a method for "depositing a platinum group metal onto a substrate in a CVD deposition chamber in the presence of both oxygen and nitrous oxide, said platinum group metal having a flow rate in the range of from about 50 to about 500 sccm, wherein said oxygen and nitrous oxide have a combined flow rate in the range of from about 1500 sccm to about 2500 sccm, said depositing being performed at a predetermined temperature of from about 200°C to about 300°C.," as recited in claim 56.

Baum does not teach or suggest a method of depositing a platinum group metal by "introducing a substrate into a CVD deposition chamber, bubbling an organic platinum group metal precursor into a non-reactive gas to form a gaseous mixture; introducing said gaseous mixture into said CVD deposition chamber at a flow rate of from about 50 to about 500 sccm; introducing oxygen to said CVD deposition chamber at a predetermined first flow rate; introducing nitrous oxide to said CVD deposition chamber at a predetermined second flow rate, said first and said second flow rates having a combined flow rate in the range of from about 1500 sccm to about 2500 sccm; and depositing said platinum group onto said substrate in said CVD deposition chamber at a predetermined temperature of from about 200°C to about 300°C," as recited in claim 61.

Similarly, Baum does not teach or suggest a method of depositing platinum onto a substrate by "introducing a substrate into a CVD deposition chamber; bubbling an organic platinum precursor into a non-reactive gas to form a gaseous mixture, said organic platinum precursor selected from the group consisting of cyclopentadienyl trimethylplatinum (IV) and methylcyclopentadienyl trimethylplatainum; introducing said gaseous mixture to said CVD deposition chamber at a flow rate of from about 100 to about 250 sccm; introducing a 50/50 mixture by volume of oxygen and nitrous oxide to said CVD deposition chamber, said mixture of oxygen and nitrous oxide having a combined flow rate in the range of from about 1500 sccm to about 2500 sccm; depositing said platinum group metal onto said substrate in said CVD deposition chamber at a temperature of from about 200°C to about 300°C and a time of from about 45 seconds to about 1000 seconds," as recited in claim 66.

Applicant respectfully submits that Baum merely discloses a "liquid delivery approach to the transport of a platinum source reagent to a CVD reactor." (Col. 4, lines 34-35). In other words, Baum merely teaches a conventional CVD deposition process. Baum discloses "volatilizing the platinum source reagent liquid solution to form a platinum source reagent vapor therefrom, and transporting the resulting platinum source reagent vapor to a chemical vapor deposition reactor." (Col. 7, lines 36-40).

However, Baum does not teach or suggest, "bubbling an organic platinum group metal precursor into a non-reactive gas to form a gaseous mixture; introducing said gaseous mixture into said CVD deposition chamber at a flow rate of from about 50 to about 500 sccm," as recited in claim 61 (emphasis added), or "bubbling an organic platinum precursor into a non-reactive gas to form a gaseous mixture . . . [and] introducing said gaseous mixture to said CVD deposition chamber at a flow rate of from about 100 to about 250 sccm," as recited in claim 66 (emphasis added).

Although, Baum may suggest the "use of oxidizer gas(es) such as oxygen (O_2), ozone (O_3), nitrous oxide (N_2O), and mixtures thereof, in the Pt CVD process," Baum fails to teach or suggest that the oxygen and nitrous oxide mixture have "a combined flow

rate in the range of from about 1500 sccm to about 2500 sccm," as recited in claims 56, 61 and 66. Similarly, Baum does not teach or suggest that the flow rate for the platinum metal precursor is "from about 50 to about 500 sccm," as recited in claims 56, 61 and 66.

As provided in the Declaration of Cem Basceri, Ph.D., filed September 13, 2001 and now of record, "[e]xcessive dilution of a precursor gas or of a metal-containing gas can in fact ultimately have a detrimental effect, leading to poor step coverage. Such dilution of a metal containing gas can occur if the flow rates of the oxidizer and/or the inert gases are increased beyond a certain limit during a deposition process." Applicant teaches that the flow rate of the platinum metal group in relation to the flow rate of the nitrous oxide and oxygen mixture, yields a platinum metal deposited with good step coverage.

The Office Action argues that chemical vapor deposition conditions would clearly include "the reaction pressure, flow rates of reactants and carrier gases, deposition times, ratios of reactants to each other and to carrier gases, etc . . . are readily determined through routine experimentation for optimization . . . [and] would have been prima facie obvious in the absence of evidence which shows a criticality for using the claimed values." (Office Action, pg. 4).

Applicant respectfully submits that a prima facie case of obviousness has not been set forth. "[T]he prior art reference (or references when combined) must teach or suggest all of the claim limitations." M.P.E.P. § 2142. Thus, "[t]o establish *prima facie* obviousness of a claimed invention, all of the claim limitations must be taught or suggested by the prior art." M.P.E.P. § 2143.03. Where "claimed ranges overlap or lie inside ranges disclosed by the prior art, a *prima facie* case of obviousness exists." M.P.E.P. § 2144.05.

However, this is not the situation in the present case. Baum does not teach or suggest any flow rates for either nitrous oxide, oxygen, or the platinum metal gaseous mixture. The prior art does not teach any of Applicant's claimed ranges. In other words, Baum does not teach or suggest any pressures, time, or thicknesses for the process. M.P.E.P. § 2144.05 provides that "where the general conditions of a claim are disclosed in

the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." (emphasis added). The general conditions of claims 56, 61 and 66 are not disclosed in Baum in any manner. Applicant does not need to show or provide evidence of the criticality of the claimed flow rates since the Office Action has not set forth a *prima facie* case of obviousness. Therefore, the § 103(a) rejection should be withdrawn.

Moreover, Applicant teaches that a platinum layer 210 which is formed by CVD deposition using a conventional platinum precursor, results in an inconsistent film formed on the inside walls 240 and bottom 250 of a capacitor without good step coverage, even when oxygen is used (See Applicant's specification, pg. 3, lines 10-26). Applying Applicant's specific parameters such as bubbling the organic platinum group metal into a non-reactive gas to form a gaseous mixture, having a particular flow rate for the platinum gaseous mixture, having particular flow rates for the oxygen and nitrous oxide mixture, having particular temperatures, having particular pressures, and particular time parameters, yields a platinum film that is continuous and has good step coverage. In fact, Applicant discloses through Examples 1-4 that a resultant film with good step coverage results when Applicant's disclosed parameters are employed.

Applicant's Example 2 teaches that by depositing the platinum with the helium carrier having a flow rate of 200 sccm for 100 seconds, at a temperature of 275°C, at a pressure of 30 Torr, with an oxygen and nitrous oxide combined flow rate of 1800 sccm, resulted in a continuous deposition of platinum on the silicon (Applicant's specification, pg. 16, lines 20-30 and FIG. 2). In contrast, depositing the platinum with the helium carrier having a flow rate of 200 sccm for 120 seconds, at a temperature of 400°C, at a pressure of 15 Torr, with an oxygen and nitrous oxide combined flow rate of 900 sccm, resulted in rough deposition of platinum on the silicon (Applicant's specification, pg. 17, line 25 through pg. 18, line 7 and FIG. 3).

Claims 57-60 depend from independent claim 56 and are at least allowable for the reasons set forth above with regard to claim 56. Claims 62-65 depend from independent claim 61 and are at least allowable for the reasons set forth above with regard

to claim 61. Claims 67-68 depend from independent claim 66 and are at least allowable for the reasons set forth above with regard to claim 66. Accordingly, the withdrawal of this rejection with regard to claims 56-68 is solicited.

Claims 61-68 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Baum in view of Kwon. The rejection is respectfully traversed and reconsideration is respectfully requested in light of the current Amendment.

As indicated above, Baum does not teach or suggest any of the claimed parameters found in independent claims 61 and 66. Specifically, Baum does not teach or suggest "bubbling an organic platinum group metal precursor into a non-reactive gas to form a gaseous mixture; introducing said gaseous mixture into said CVD deposition chamber at a flow rate of from about 50 to about 500 sccm," as recited in claim 61 (emphasis added), or "bubbling an organic platinum precursor into a non-reactive gas to form a gaseous mixture . . . [and] introducing said gaseous mixture to said CVD deposition chamber at a flow rate of from about 100 to about 250 sccm," as recited in claim 66 (emphasis added).

Claims 62-65 depend from independent claim 61 and are allowable for at least the reasons set forth above with regard to claim 61. Claims 67-68 depend from independent claim 66 and are allowable for at least the reasons set forth above with regard to claim 66. Kwon is relied upon for teaching a bubbler system to deliver a platinum metal precursor and adds nothing to rectify the deficiencies associated with Baum. In particular, Baum fails to teach or suggest bubbling the platinum group metal into a non-reactive gas to form a gaseous mixture, having a particular flow rate for the platinum gaseous mixture, and having particular flow rates for the oxygen and nitrous oxide mixture.

Claims 1-4, 6-10, 12-23, 26-36, and 46-55 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Baum in view of Kwon and Chen. The rejection is respectfully traversed and reconsideration is respectfully requested in light of the current Amendment.

Baum does not teach or suggest "depositing a platinum group metal in gaseous form onto a substrate . . . with a flow rate of from about 50 to about 500 sccm in the presence of an oxygen and nitrous oxide mixture, said mixture comprising about 5% to about 95% by volume oxygen, wherein said mixture has a combined flow rate in the range of from about 1500 sccm to about 2500 sccm, and said platinum group metal being deposited . . . at a pressure of from about 10 to about 1000 Torr," as recited in claim 1.

Baum does not teach or suggest "bubbling an organic platinum group metal precursor into a non-reactive gas to form a gaseous mixture; introducing said gaseous mixture . . . at a flow rate of from about 50 to about 500 sccm; introducing oxygen . . . at a predetermined first flow rate; introducing nitrous oxide. . . at a predetermined second flow rate, said first and said second flow rates having a combined flow rate in the range of from about 1500 sccm to about 2500 sccm; and depositing said platinum group metal . . . at a pressure of from about 10 to about 1000 Torr," as recited in claim 6.

Similarly, Baum does not teach or suggest "bubbling an organic platinum precursor into a non-reactive gas to form a gaseous mixture, said organic platinum precursor selected from the group consisting of cyclopentadienyl trimethylplatinum (IV) and methylcyclopentadienyl trimethylplatinum; introducing said gaseous mixture . . . at a flow rate of from about 100 to about 250 sccm; introducing a gaseous mixture of oxygen and nitrous oxide that is from about 5% to about 95% volume of nitrous oxide . . . having a combined flow rate in the range of from about 1500 sccm to about 2500 sccm; and depositing said platinum group metal onto said substrate in said CVD deposition chamber at a temperature of from about 200 to about 600°C and at a pressure of from about 10 to about 1000 Torr," as recited in claim 25.

As discussed above, Baum merely teaches a conventional CVD deposition process. Baum does not teach or suggest Applicant's claimed flow rates. Moreover, Applicant respectfully submits that a prima facie case of obviousness has not been set forth. Baum does not teach or suggest any flow rates for either nitrous oxide, oxygen, or the platinum metal gaseous mixture. The prior art simply does not teach any of Applicant's

claimed ranges. In other words, Baum does not teach or suggest any flow rates, pressures, time, or thicknesses for Applicant's claimed process. The general conditions of claims 1, 6 and 25 are not disclosed in Baum in any manner. See M.P.E.P. § 2144.05. Thus, Applicant does not need to show or provide evidence of the criticality of the claimed flow rates since the Office Action has not set forth a *prima facie* case of obviousness. Therefore, the § 103(a) rejection should be withdrawn.

Moreover, applying Applicant's specific parameters such as bubbling the organic platinum group metal into a non-reactive gas to form a gaseous mixture, having a particular flow rate for the platinum gaseous mixture, having particular flow rates for the oxygen and nitrous oxide mixture, having particular temperatures, having particular pressures, and particular time parameters, yields a platinum film that is continuous and has good step coverage. In fact, Applicant discloses through Examples 1-4 that a resultant film with good step coverage results when Applicant's disclosed parameters are employed.

Claims 2-4 and 46-47 depend from independent claim 1 and are at least allowable for the reasons set forth above with regard to claim 1. Claims 7-10, 12-14, 17-24, and 48-51 depend from independent claim 6 and are at least allowable for the reasons set forth above with regard to claim 6. Claims 26-35 and 52-55 depend from independent claim 25 and are at least allowable for the reasons set forth above with regard to claim 25. Accordingly, the withdrawal of this rejection with regard to claims 1-4, 6-10, 12-23, 26-36, and 46-55 is solicited.

Claim 24 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Baum in view of Kwon and Chen, and further in view of Chivukula. The rejection is respectfully traversed and reconsideration is respectfully requested in light of the current Amendment.

Claim 24 depends from independent claim 6 and is allowable for at least the reasons set forth above with regard to claim 6. In particular, the combination of Baum, Kwon and Chen fail to teach or suggest bubbling an organic platinum group metal

precursor into a non-reactive gas to form a gaseous mixture having a particular flow rate of about 50 to about 500 sccm for the platinum gaseous mixture, having a combined flow rate for the oxygen and nitrous oxide mixture of from about 1500 sccm to about 2500 sccm, and depositing the metal group at a pressure of from about 10 to about 1000 Torr. Chivukula is relied upon for teaching the thickness of the Pt film layer adds nothing to rectify the deficiencies associated with Baum, Kwon or Chen.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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Respectfully submitted,

By _____

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